

MEAN LAKE LEVELS DURING JANUARY, 1924.

By UNITED STATES LAKE SURVEY.

[Detroit, Mich., Feb. 5, 1924.]

The following data are reported in the "Notice to Mariners" of the above date:

Data.	Lakes. ¹			
	Superior.	Michigan and Huron.	Erie.	Ontario.
	Feet.	Feet.	Feet.	Feet.
Mean level during January, 1924.....	601.56	578.58	571.29	244.77
Above mean sea level at New York.....				
Above or below—				
Mean stage of December, 1923.....	-0.17	-0.22	+0.04	+0.30
Mean stage of January, 1923.....	-0.22	-0.44	+0.13	+0.27
Average stage for January, last 10 years.....	-0.55	-1.32	-0.35	-0.51
Highest recorded January stage.....	-1.22	-4.09	-2.26	-2.83
Lowest recorded January stage.....	+0.68	-0.44	+0.33	+0.97
Average relation of the January level to—				
December level.....		(?)	-0.1	(?)
February level.....		(?)	+0.2	(?)

¹ Lake St. Clair's level: In January, 1924, 574.08 feet. ² Practically no difference.

EFFECT OF WEATHER ON CROPS AND OUTDOOR OPERATIONS, JANUARY, 1924.

By J. B. KINCER.

January was generally cold, stormy, and disagreeable in nearly all sections of the country, and mostly unfavorable for outdoor operations. Very little field work was accomplished in the Southern States because of frequent rains and cold weather, although considerable preparation of soil was accomplished in much of Texas and in Florida. The conditions were favorable for lumbering in the Central-Northern and Northeastern States, and good weather for ice harvest prevailed generally in the North.

Winter wheat fields were fairly well protected by snow during much of the month in the northern portions of Ohio, Indiana, and Illinois, but the weather was hard on wheat and other grains in the immediate Ohio Valley, especially Kentucky and in Tennessee, while winter oats were severely damaged by freezing in the Southeast. There was considerable complaint of wheat lifting as a result of alternate freezing and thawing in immediate Ohio Valley localities, and late-sown fields were badly damaged, though the early-sown, well-rooted grain fared better.

Wheat was mainly frozen to the ground in Kansas, but came through the cold weather with apparently little

damage, largely because of the splendid root system established through favorable growing conditions in the fall and early winter months. Wheat apparently was not damaged appreciably in other western portions of the belt, though there was complaint of alternate thawing and freezing during a part of the month in the extreme lower Great Plains.

Severely cold weather overspread the Southeastern States early in the month, bringing temperatures slightly below zero in the northern parts of the east Gulf States, with 14° above zero extending to the east Gulf coast. This freeze destroyed tender truck crops in the lower Mississippi Valley and damaged hardy varieties. Cabbage was almost completely destroyed in southern Alabama, while other truck crops were nearly all killed in southern Georgia and extreme northern Florida. There was much damage also in the South Atlantic States, especially in South Carolina. Truck fared better in the west Gulf districts where no widespread, serious damage occurred.

Most of the month was cold, stormy, and unfavorable for stock in the Great Plains and Rocky Mountain districts. The snow-covered range in the Mountain States necessitated much feeding. The latter part of the month was warmer, however, and more favorable for stock interests in the great western grazing sections. Pastures were generally poor in the Southeastern States because of unfavorable fall and winter weather, and considerable feeding of livestock was necessary, with feed scarce in some sections. Pastures and ranges were very poor in California because of deficient moisture, and feeding was general, with heavy losses of range cattle and sheep.

During the first part of the month there was considerable damage by frost to citrus fruit in the San Joaquin Valley of California, and some harm was reported from southern California, while at the same time satsumas were defoliated in east Gulf districts, the younger trees especially being injured. There was no damage in the main citrus belt of Florida, however, where the month on the whole was favorable. The premature development of fruit buds in the South Atlantic Coast States was checked by the cold weather, and the cold apparently did little harm to fruits in southern Texas, while citrus in Arizona escaped injury. Peach buds were reported in good condition in Georgia, but there was considerable complaint of damage in the Lake districts of Ohio and in Indiana and Illinois during the first half of the month.

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CLIMATOLOGICAL TABLES.

DESCRIPTION OF TABLES AND CHARTS.

Table I gives the data ordinarily needed for climatological studies for about 176 Weather Bureau stations making simultaneous observations at 8 a. m. and 8 p. m. daily, 75th meridian time, and for about 37 others making only one observation. The altitudes of the instruments above ground are also given.

Table II gives, for about 35 stations of the Canadian Meteorological Service, the means of pressure and temperature, total precipitation, and depth of snowfall, and the respective departures from normal values except in the case of snowfall. The sea-level pressures have been computed according to the method described by Prof. F. H. Bigelow in the REVIEW of January, 1902, pages 13-16.

Chart I.—Tracks of centers of ANTICYCLONES; and

Chart II.—Tracks of centers of CYCLONES. The Roman numerals show the chronological order of the centers. The figures within the circles show the days of the month; the letters *a* and *p* indicate, respectively, the observations at 8 a. m. and 8 p. m., 75th meridian time. Within

each circle is also given (Chart I) the last three figures of the highest barometric reading, or (Chart II) the lowest reading reported at or near the center at that time, and in both cases as reduced to sea level and standard gravity. The inset map in Chart I shows the departure of monthly mean pressure from normal and the inset in Chart II shows the change in mean pressure from the preceding month.

Chart III.—Temperature departures. This chart presents the departures of the monthly mean surface temperatures from the monthly normals. The shaded portions of the chart indicate areas of positive departures and unshaded portions indicate areas of negative departures. Generalized lines connect places having approximately equal departures of like sign. This chart of monthly surface temperature departures in the United States was first published in the MONTHLY WEATHER REVIEW for July, 1909.

Chart IV.—Total precipitation. The scales of shading with appropriate lines show the distribution of the

monthly precipitation. The inset on this chart shows the departure of the monthly totals from the corresponding normals.

Chart V.—*Percentage of clear sky between sunrise and sunset.* The average cloudiness at each Weather Bureau station is determined by numerous personal observations between sunrise and sunset. The difference between the observed cloudiness and 100 is assumed to represent the percentage of clear sky, and the values thus obtained are the basis of this chart. The chart does not relate to the nighttime.

Chart VI.—*Isobars at sea level, average surface temperatures, and prevailing wind directions.* The pressures have been reduced to sea level and standard gravity by the method described by Prof. Frank H. Bigelow on pages 13-16 of the REVIEW for January, 1902. The pressures have also been reduced to the mean of the 24 hours by the application of a suitable correction to the mean of 8 a. m. and 8 p. m. readings at stations taking two observations daily, and to the 8 a. m. or the 8 p. m. observation, respectively, at stations taking but

a single observation. The diurnal corrections so applied will be found in the Annual Report of the Chief of the Weather Bureau, 1900-1901, volume 2, Table 27, pages 140-164.

The sea level temperatures are now omitted and average surface temperatures substituted. The isotherms can not be drawn in such detail as might be desired, for data from only the regular Weather Bureau stations are used.

The prevailing wind directions are determined from hourly observations at the great majority of the stations. A few stations determine the prevailing direction from the daily or twice-daily observations only.

Chart VII.—*Total snowfall.* This is based on the reports from regular and cooperative observers and shows the depth in inches of the snowfall during the month. In general, the depth is shown by lines inclosing areas of equal snowfall, but in special cases figures are also given. This chart is published only when the snowfall is sufficiently extensive to justify its preparation.

Charts VIII, IX, etc.—*North Atlantic weather maps of particular days.*

CONDENSED CLIMATOLOGICAL SUMMARY.

In the following table are given for the various sections of the climatological service of the Weather Bureau the monthly average temperature and total rainfall; the stations reporting the highest and lowest temperatures, with dates of occurrence; the stations reporting the greatest and least total precipitation; and other data as indicated by the several headings.

The mean temperature for each section, the highest and lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperatures and precipitation are based only on records from stations that have 10 or more years of observations. Of course, the number of such records is smaller than the total number of stations.

Condensed climatological summary of temperature and precipitation by sections, January, 1924.

Section.	Temperature.						Precipitation.					
	Section average.	Departure from the normal.	Monthly extremes.				Section average.	Departure from the normal.	Greatest monthly.		Least monthly.	
			Station.	Highest.	Date.	Station.	Lowest.	Date.	Station.	Amount.	Station.	Amount.
Alabama	41.8	-4.7	3 stations.....	75	11	Valley Head.....	-2	5	6.67	+1.73	Pushmataha.....	0.32
Arizona	40.5	-2.0	Yuma Citrus Station	81	30	Williams.....	-16	1	0.00	-1.32	Henry's Camp.....	0.64
Arkansas	36.1	-1.8	Rison.....	79	31	4 stations.....	-6	5	3.19	-1.04	Warren.....	6.50
California	45.3	-0.5	Barrett Dam.....	86	30	Helm Creek.....	-33	2	1.97	-3.52	Wright.....	7.02
Colorado	20.1	+4.4	Las Animas.....	74	31	4 stations.....	-40	15	0.38	-0.50	Steamboat Springs.....	2.07
Florida	59.9	+0.6	2 stations.....	88	11	do.....	12	16	4.12	+1.25	Cottage Hill.....	8.79
Georgia	43.3	-3.5	St. George.....	81	3	Clayton.....	-9	6	5.39	+1.45	Clayton.....	11.58
Idaho	19.8	-3.7	Burley.....	57	31	3 stations.....	-33	4	1.04	-1.18	Priest River Ex. Station.	4.08
Illinois	21.9	-4.6	Carbondale.....	62	30	Freeport.....	-25	5	1.78	-0.66	Golconda.....	3.16
Indiana	23.8	-4.8	Hickory Hill.....	60	29	2 stations.....	-20	21	2.97	-0.22	Jeffersonville.....	4.76
Iowa	13.9	-4.0	Keokuk.....	59	8	Washita.....	-26	5	0.89	-0.16	Waverly.....	2.47
Kansas	26.2	-3.6	2 stations.....	67	18	Centralia.....	-27	5	0.39	-0.26	Walnut.....	1.61
Kentucky	31.3	-4.2	do.....	66	11	2 stations.....	-8	15	5.02	+0.64	Glasgow.....	6.96
Louisiana	46.7	-4.5	do.....	80	12	Kelly (near).....	8	6	6.39	+1.84	Baton Rouge.....	8.98
Maryland-Delaware	33.7	+1.1	3 stations.....	67	11	Frostburg, Md.....	-10	6	4.06	+0.78	Woodstock, Md.....	6.10
Michigan	15.8	-3.7	Harbor Beach.....	55	5	Bergland.....	-30	21	2.26	+0.36	Grand Marais.....	5.73
Minnesota	42.2	-5.1	Canby.....	60	29	Itasca State Park.....	-47	6	0.37	-0.40	do.....	1.35
Mississippi	24.9	-5.5	Shubuta.....	78	1	2 stations.....	-2	6	6.56	+1.59	Maconia.....	10.98
Montana	15.6	-2.9	2 stations.....	68	31	Conception.....	-25	5	1.54	-0.49	Caruthersville.....	4.44
Nebraska	17.4	-4.6	Hay.....	63	31	Kinread.....	-53	1	0.68	-0.31	Trout Creek.....	2.97
Nevada	25.4	-2.8	McCook.....	68	30	Gordon.....	-37	5	0.34	-0.22	Tecumseh.....	1.70
New England	23.6	+5.8	Pahrump.....	75	26	Millett.....	-31	6	0.34	-0.76	Austin.....	1.10
New Jersey	32.2	+2.2	Plymouth, Mass.....	68	12	2 stations.....	-34	28	3.72	+0.35	Kingston, R. I.....	6.40
New Mexico	30.6	+3.2	Little Falls.....	65	11	Culvers Lake.....	-6	27	4.48	+0.83	Charlotteburg.....	5.69
New York	34.9	+2.0	Pearl.....	74	31	Dulce.....	-24	5	0.21	-0.40	Lake Alice.....	1.43
North Carolina	31.9	-1.6	Ballston Lake.....	62	11	2 stations.....	-40	27	3.26	+0.30	Lowville.....	7.97
North Dakota	2.6	-2.3	Greenville.....	75	9	Banners Elk.....	-12	6	4.75	+1.01	Highlands.....	8.67
Ohio	25.0	-3.3	Berthold Agency.....	61	31	Dunseith.....	-42	11	0.23	-0.31	Hannah.....	0.96
Oklahoma	34.7	-4.0	Clarington.....	64	1	Faulding.....	-16	22	3.73	+0.63	Bucyrus.....	5.87
Oregon	31.3	-1.4	Goodwell.....	76	30	Goodwell.....	-10	17	0.72	-0.65	Antlers.....	3.80
Pennsylvania	28.1	+0.3	Altus.....	69	30	Madras.....	-24	1	2.46	-2.14	Government Camp.....	9.73
South Carolina	43.3	-2.3	2 stations.....	65	1	Montrose.....	-13	28	4.34	+1.05	Phoenixville.....	6.29
South Dakota	10.7	-4.6	New Castle.....	76	3	Landrum.....	1	6	4.34	+0.88	Walhalla.....	6.20
Tennessee	34.2	-4.8	Rapid City.....	59	31	La Delle.....	-41	5	0.21	-0.31	Harveys Ranch.....	1.10
Texas	43.5	-4.9	Sevierville.....	71	10	Rugby.....	-13	6	5.87	+0.92	Lynnville.....	8.82
Utah	20.1	-5.3	2 stations.....	86	13	Dalhart.....	-5	1	1.73	-0.02	Willis.....	7.75
Virginia	35.3	-0.7	Leeds.....	68	31	Fangitch.....	-30	5	0.47	-0.84	Silver Lake.....	2.49
Washington	29.6	-1.4	Runnymede.....	75	11	Burkes Garden.....	-12	6	3.93	+0.62	Mendota.....	6.78
West Virginia	30.1	-2.7	Kennewick.....	69	31	Snyders Ranch.....	-33	1	3.50	-1.15	Forks.....	18.47
Wisconsin	6.7	-7.2	Clarksburg.....	70	12	Cheat Bridge.....	-15	6	4.62	+0.57	Cheat Bridge.....	7.14
Wyoming	15.1	-4.2	Kilbourn.....	48	30	Hatfield.....	-44	4	0.81	-0.43	Beloit.....	2.09
			3 stations.....	57	30	4 stations.....	-42	11	0.52	-0.33	Bedford.....	1.38
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1 Other dates also.